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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/746,277	12/21/2000	William Eric Main	SC11507ZC	2788
23125	7590	02/23/2005	EXAMINER	
FREESCALE SEMICONDUCTOR, INC.			WANG, TED M	
LAW DEPARTMENT			ART UNIT	
7700 WEST PARMER LANE MD:TX32/PL02			PAPER NUMBER	
AUSTIN, TX 78729			2634	

DATE MAILED: 02/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/746,277

Applicant(s)

MAIN ET AL.

Examiner

Ted M Wang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 06 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1 and 4-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 19-24 is/are allowed.
- 6) ☒ Claim(s) 1,10,11,15,16 and 25-27 is/are rejected.
- 7) ☒ Claim(s) 4-9,12-14,17 and 18 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 December 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant's arguments, filed on 7/6/2004, with respect to claims 1 and 4-28 have been fully considered. The applicant cancels the rejected claim 28.
2. The indicated allowability of claims 1, 10, 11, 15, 16, and 25-27 are withdrawn in view of the newly discovered reference(s) to US 4,578,594, US 4,370,520, US 6,023,491 and US 6,133,802. Rejections based on the newly cited references follow.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:  
  
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
4. Claim 27 recites the limitation "when a threshold value is exceeded" in line 3. With regard to above recited limitation, it is not clear that which signal is compared to this threshold value. There is insufficient antecedent basis for this limitation in the claim.

### ***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 15 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Santos (US 4,578,594).

- With regard claim 15, Santos discloses a circuit having first and second input terminals (Fig.1 element IN+ and IN-) coupled for receiving a differential current (column 1 lines 14-22 and 56-68) and an output terminal that supplies a current that is a function of a difference of the differential current (Fig.1 element OUT), the circuit comprising:
  - a first current path from the first input terminal to the output terminal (Fig.1 elements Q1, Q3, Q7, and Q8, and column 1 line 23 – column 2 line 55);
  - a second current path from the second input terminal to the output terminal (Fig.1 elements Q2, Q4, Q7, and Q8, and column 1 line 23 – column 2 line 55); and
  - first and second switches (Fig.1 elements OE and BIAS 2) coupled for receiving a signal that disables the respective first and second current paths from providing the current that is the function of the difference of the differential current (column 1 line 23 – column 2 line 55).
- With regard claim 16, Santos further discloses the first current path includes first and second current mirrors coupled between the first input terminal and the output terminal of the circuit (Fig.1 elements Q1, Q3, Q7, and Q8), the first current mirror receiving the first current (Fig.1 element IN+) and the second current mirror providing a first portion of the output current (FIG.1 element OUT and column 1 line 23 – column 2 line 55).

7. Claim 25 is rejected under 35 U.S.C. 102(b) as being anticipated by Malchow (US 4,370,520).

- With regard claim 25, Malchow discloses a method for generating an Automatic Frequency Control (AFC) signal (Fig.2 elements 48, 50, and 52) based on a modulated signal (Fig.3 element 67), comprising:  
enabling a tuning circuit for generating the AFC signal as a function of a difference in first and second currents supplied to the tuning circuit when data is not present in the modulated signal (Fig.3 elements 50, 54, and 56, and column 7 lines 6-22); and  
disabling the AFC signal when data is present in the modulated signal (Fig.3 elements 50, 54, and 56, column 3 line 61 – column 4 line 19, and column 7 lines 23-42).

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Main (US 5,650,749) in view of Saka et al. (US 6,023,491).

- With regard claim 1, Main discloses an injection-locked demodulator circuit with Automatic Frequency Control (AFC), comprising:  
an injection-locked oscillator having a first input for receiving a modulated signal (Fig.1 elements 111, 121, and column 2 lines 4-20);

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a multiplier (Fig.1 element 122) having a first input for receiving the modulated signal (Fig.1 elements 111 and 122) and a second input for receiving a signal generated by the injection-locked oscillator (Fig.1 elements 116, 122); and a filter having an input coupled to an output of the multiplier and an output coupled to a second input of the injection-locked oscillator (Fig.1 element 123).

Main discloses all of the subject matter as described above except for specifically teaching a tuning circuit coupled to an output of the multiplier for receiving first and second input signals, the tuning circuit disabling the AFC until a difference in the first and second input signals reaches a threshold value.

However, Saka et al. teaches a tuning circuit (Fig.1 elements 20 and 21) coupled to an output of the multiplier (Fig.1 element 12), the tuning circuit disabling the AFC until a difference in the first and second input signals reaches a threshold value (Fig.1 elements 20 and 21, and column 14 lines 24-51).

It is desirable to include a tuning circuit coupled to an output of the multiplier for receiving first and second input signals, the tuning circuit disabling the AFC until a difference in the first and second input signals reaches a threshold value in order to improve the OPSK demodulation operation (column 14 lines 24-48).

Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the demodulated circuit as taught by Saka et al. in which, a tuning circuit coupled to an output of the multiplier for receiving first and second input signals, the tuning circuit disabling the AFC until a difference in the first and second input signals reaches a threshold value in

order to improve the accuracy of the modulated carrier frequency, into Main's injection-locked demodulator circuit between phase detector (multiplier) and low pass filter so as to improve the OPSK demodulation operation.

10. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Main (US 5,650,749) and Saka et al. (US 6,023,491) as applied to claim 1 above, and further in view of Malchow (US 4,370,520).

- With regard claim 10, Main and Saka et al. disclose all of the subject matter as described above except for specifically teaching that AFC is enabled when the modulated signal has no data and disabled when the modulated signal has data. However, Malchow teaches that AFC is enabled when the modulated signal has no data and disabled when the modulated signal has data (column 4 lines 4-19 and column 7 lines 5-42).

It is desirable that AFC is enabled when the modulated signal has no data and disabled when the modulated signal has data in order to improve the frequency deviation of the IF signal (column 3 lines 47-53). Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the apparatus/method as taught by Malchow in which, AFC is enabled when the modulated signal has no data and disabled when the modulated signal has data.

- With regard claim 11, Main and Saka et al. disclose all of the subject matter as described above except for specifically teaching that tuning circuit further

includes another input for receiving a signal that controls when the AFC is enable and disabled.

However, Malchow teaches that tuning circuit further includes another input for receiving a signal that controls when the AFC is enable and disabled (Fig.3 element REF 3, column 6 lines 1-6, and column 7 lines 32-42).

It is desirable that tuning circuit further includes another input for receiving a signal that controls when the AFC is enable and disabled in order to improve the frequency deviation of the IF signal caused by the received RF input signal (column 3 lines 47-53). Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the demodulator circuit as taught by Malchow in which, tuning circuit further includes another input for receiving a signal that controls when the AFC is enable and disabled, into Main and Sakas' injection-locked demodulator so as to improve the frequency deviation of the IF signal caused by the received RF input signal.

11. Claims 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ma (US 6,133,802) in view of Malchow (US 4,370,520).

- With regard claim 26, Ma discloses an injection-locked demodulator comprising:  
providing the injection-locked demodulator (Fig.1) with an unmodulated signal at the carrier frequency of the modulated signal (Fig.4 and column 1 lines 40-60);  
providing the injection-locked demodulator with a modulated signal (Fig.1 element modulated signal to input of the injection locked oscillator).



Ma discloses all of the subject matter as described above except for specifically teaching disabling the AFC signal in the presence of the modulated signal to prevent detuning the injection-locked demodulator.

However, Malchow teaches that disabling the AFC signal in the presence of the modulated signal to prevent detuning the injection-locked demodulator (Fig.3 elements 50, 54, and 56, column 3 line 61 – column 4 line 19, and column 7 lines 23-42).

It is desirable to disable the AFC signal in the presence of the modulated signal to prevent detuning the injection-locked demodulator in order to improve the AFC loop operation (column 4 line 49 –column 5 line 3). Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the method as taught by Malchow in which, disabling the AFC signal in the presence of the modulated signal to prevent detuning the injection-locked demodulator, into Ma's injection demodulator so as to improve the AFC loop operation.

- With regard claim 27, Ma discloses an injection-locked demodulator comprising: tuning the injection locked demodulator when the enable signal is greater than a threshold value (Figs. 1-4 element ENABLE, column 1 line 61 – column 2 line 8, column 4 lines 16-23, and column 4 lines 55-64), where the threshold value will be a minimum logic high voltage related to the inverter (Fig.2 element 508).

Ma discloses all of the subject matter as described above except for specifically teaching allowing only that portion of the AFC signal that exceeds the threshold value to pass to an AFC filter and an oscillator.

However, Malchow teaches that allowing only that portion of the AFC signal that exceeds the threshold value (Figs. 1 and 3 element 54) to pass to an AFC filter (Fig.1 element 48) and an oscillator (Fig.1 element 16 and column 4 line 4 - column 5 line 61).

It is desirable to allow only that portion of the AFC signal that exceeds the threshold value to pass to an AFC filter and an oscillator (column 4 line 49 – column 5 line 3). Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the method as taught by Malchow in which, allowing only that portion of the AFC signal that exceeds the threshold value to pass to an AFC filter and an oscillator, into Ma's injection demodulator so as to improve the AFC loop operation.

***Allowable Subject Matter***

12. Claims 19-24 are allowed.
13. Claims 4-9, 12-14, 17, and 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

**Conclusion**

14. References US 3,764,917 and US 4,208,741 are cited because they are put pertinent to the demodulator with AFC control. However, none of references teach detailed connection as recited in claim.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ted M Wang whose telephone number is (571) 272-3053. The examiner can normally be reached on 8:30 a.m. - 5:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on (571) 272-3056. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-0377.

Ted M Wang  
Examiner  
Art Unit 2634

Ted M. Wang



**SHUWANG LIU**  
**PRIMARY EXAMINER**